Digital Notice Board Using Raspberry Pi

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Abstract - **Notice Board is primary thing in any institution or public utility places like bus stations, railway stations, colleges, malls, etc. But sticking various notices day to day is a difficult process. A separate person is required to take care of this notices display. This project is about advanced wireless notice board. The project is built around ARM controller raspberry-pi which is heart of the system. Display is obtained on project tor. A Wi-Fi is using for Data transmission. At any time we can add or re- move or alter the text according to our requirement. At transmitter authorized PC is used for sending a notices. At receiving end Wi-Fi is connected to raspberry pi. When an authorized user sends a notice from his system, it is received by receiver. Wireless is a popular technology that allows an electronic device to exchange data wirelessly over a computer network, including high speed wireless connections. The data is received from authenticated user.**
Then it sends to arm 11 that is raspberry pi.

Keywords - **Android System, Web Server, Raspberry pi Card, Electronics Component.**

1. Introduction

Home automation includes all electronic components, building physics, middle ware, informatics technology and telecommunications used in buildings, more or less "interoperable" and to centralize the control of different systems and subsystems of the house and company (heating, shutters, garage door, entrance gate, electrical outlets, etc.. Home automation has been developed to provide technical solutions to meet the comfort needs such that energy management, optimization of lighting and heating. Home automation could be improved through an amelioration of communication network that uses a pair of twisted lines, radio signals, or fiber optics in a busbased network or an internet protocol as standards.

1.1 Internet of Things (IoTs)

The Internet of Things (IoTs) can be described as connecting everyday objects like smart-phones, Internet TVs, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves. Building IoTs has advanced significantly in the last couple of years since it has added a new dimension to the world of information and communication technologies.

It is expected that the number of devices connected to the Internet will accumulate from 100.4 million in 2011 to 2.1 billion by the year 2021, growing at a rate of 36% per year. In the year 2011, 80% machine to machine (M2M) connections were made over mobile networks such as 2G and 3G and it is predicted that by 2021, this ratio will increase to 93% since the cost related with M2M over mobile networks are generally cheaper than fixed networks. Now anyone, from anytime and anywhere can have connectivity for anything and it is expected that these connections will extend and create an entirely advanced dynamic network of IoTs.

The development of the Internet of Things will revolutionize a number of sectors, from automation, transportation, energy, healthcare, financial services to nanotechnology. IoTs technology can also be applied to create a new concept and wide development space for smart homes to provide intelligence,confort and to improve the quality of life.

1.2 Literature Survey

It is a long process to put up notices on the notice board.

This wastes a lot of resources like paper, printer ink, man power and also loss of time. In this paper we have proposed a system which will enable people to wirelessly transmit notices on notice board using wi-fi. Here we have proposed a system by which only authenticated person can handle the notice board. It require less time due to fast data transmission through wi-fi. Less cost and save the resources like paper. Figure-I below summarizes.

Standard	Bluetooth	Zigbee	Wi-Fi
Application Focus	Cable replacement	Monitoring and control	Web, Email, Video
Frequency band	2.4 GHz	868.915MHz; 2.4GHz	2.4GHz;5GHz
Max signal rate	1Mb/s	250Kb/s	54Mb/s
Nominal Range	10m	10-100m	100m
Channel bandwidth	1MHz	0.3/0.6MHz; 2MHz	22MHz
Data protection	16-bit CRC	16-bit CRC	32-bit CRC
Max number of cell nodes	8	More than 65000	32

Figure. 1 Camparision of wifi,zigbee and Bluetooth

2. Problem Definition

Design and Implementation of Digital notice board by using raspberry pi board. The application has been installed on a Smartphone, a web server and a raspberry pi card to display text on display device. The main objective of this system is to develop a wireless notice board that display message sent from the user and to design a simple, easy to install, user friendly system, which can receive and display notice in a particular manner with respect to date and time which will help the user to easily keep the track of notice board every day and each time he uses the system

1.3 Data Flow Diagram

User can send the Text through raspberry pi using android application. if user is not authenticated the he will not send the text. Only authorized user send the text.
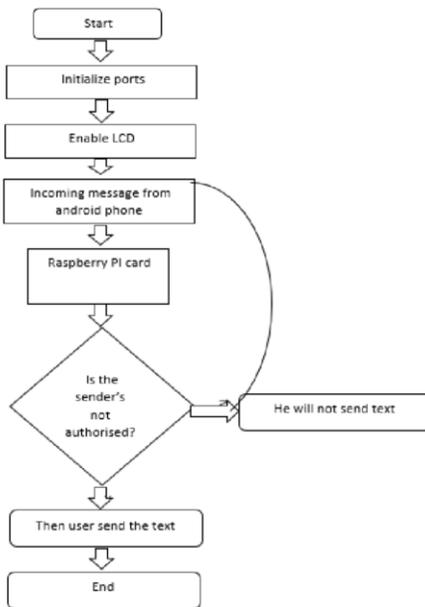
Figure. 2 Data flow Diagram

2.1 Goals and Objectives

- The main goal is to provide Exciting new innovative way to send information to your Staff visitors and Students

- The main objective of this system is to develop a wireless notice board that display message sent from the user and to design a simple, easy to install, user friendly system, which can receive and display notice in a particular manner with respect to date and time which will help the user to easily keep the track of notice board every day and each time he uses the system. Wi-Fi is the wireless technology used.

2.2 Statement of Scope

By using multiple screens for displaying the big size advertising purpose and the contents on the screen is made up of several images files and broadcasting display information and also remotely control it. The broadcasting information such as road highways ,subways, buses and bus station, train and train station, shopping malls, city squires, hospital, conference hall, colleges and schools for displaying notice for student information and displaying all institutional information for visitors and this same application in industry for displaying notices or useful information which has want to giving employees.

1.4   Three Tier Architecture

The architecture we adopted for our application (side: Android application, web service and database) is the three-tier architecture, which is a stack of three levels: The presentation of data (Level 1), Treatment business data (Level 2) and access to persistent data (Level 3).
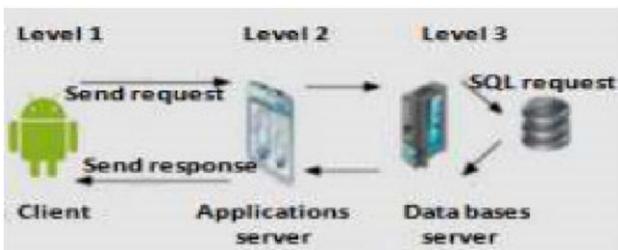

Figure. 3 Three Tier Architecture

2.3 Major Constraints

- System Constraints

1. Authenticated User can post the message.
2. Android phone necessary.
3. Internet connection is mandatory.
4. Registration is necessary for new user.

2.4 Methodologies of Problem Solving and Efficiency Issues

The system is about how a reliable and an authentic communication could easily be developed to enable display of notices on a screen since getting the information on time is really important.

The result was a central ideology, and a manifesto to go along with it.

1. A working piece of software had more value than a document that indicated what the software should do.

2. Regular collaboration with customers was valued more than extensive contracts that outlined the intended usage of a product up front.

3. And most importantly, they valued responding to change over following a plan. As a methodology, the same approach is applied to product development in spirit where project teams is recognised into small teams that work closely works together on specific component of the project.
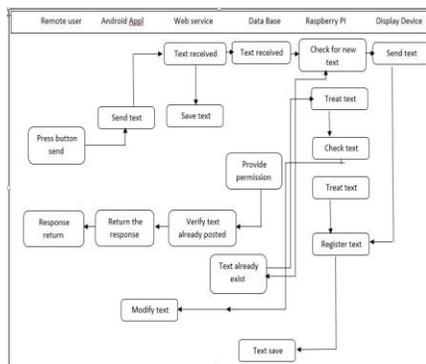
2.5 Activity Diagram

Figure. 4 Activity Diagram.

3. Hardware Requirement

3.1 Hardware Specification

3.1.1 Wi-Fi Module

Wi-Fi module is acts as a receiver. Wi-Fi uses the latest 802.11n wireless technology, and can support data rates up to 150Mb/s, compared with the older 54 Mb/s 11g products.

3.1.2 LCD Monitor

It is uses to display the notice. User will post the text after the authentication. Notice will display through the raspberry pi.
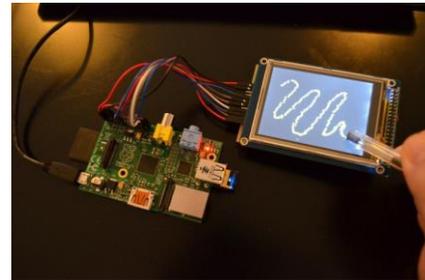

Fig. 5 LCD Monitor

3.1.3 Raspberry-Pi

The solution that we have adopted consists of the exploitation of the Raspberry pi card. It is a single nanocomputer card ARM processor designed by designer David Braben video games, as part of its foundation "Raspberry pi".

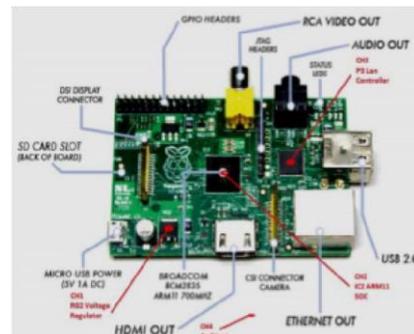The following photo presents the Raspberry pi card

Fig. 6 : Raspberry pi card

(single motherboard, without housing, power supply, keyboard, mouse and screen) with the aim to reduce costs and enable the use of recovery equipment. Around the central part, there are different connectors for connecting devices to interact with the computer. The range of connections offered by the "Raspberry pi" card is given by the following figure:
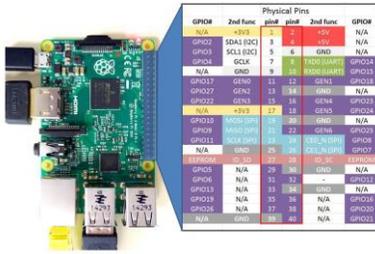
Fig.7:The Range of Raspberry pi

3.2 Hardware Setup

- Connect the Ethernet cable from the Ethernet connector of the raspberry-pi to router. Internet connection should be working. We need to do this only first time when setup raspberry-pi, so that program can update itself to the latest version. Updates are enabled by default and can be disabled later when we want.

- Connect the HDMI cable from the HDMI connector on raspberry-pi to the HDMI connector on TV.

- Plug the SD card into slot on the slot on the underside of the raspberry-pi. SD card should pushed all the way in so that it is making a good contact with the connectors.

- Plug the wireless adaptor from keyboard touchpad media controller into a USB port on raspberry-pi. Finally, insert the micro USB power supply. This will automatically boot the raspberry pi up. It shows raspberry-pi logo after successful installation.

4. Software Requirement

4.1 Android

Android provides a application platform that allows us to build the applications and games for mobiles in Java Programming language. The documents listed in the left navigation provide details about how to build apps using Android's various APIs. Apps provide multiple entry points Android apps are built as a combination of distinct components that can be invoked individually. For instance, an individual activity provides a single screen for a user interface, and a service independently performs work in the background. From one component you can start another component using an intent. You can even start a component in a different app, such as an activity in a maps app to show an address. This model provides multiple entry points for a single app and allows any app to behave as a user's "default" for an action that other apps may invoke. Apps adapt to different devices Android provides an flexible application platform that allows you to provide special resources for different device configurations. For example, you can generate different XML layout files for different screen sizes and the system decides which layout to apply based on the current device's screen size.

4.2 Python

Python is a widely used general-purpose, high-level programming language.Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java.The language provides constructs intended to enable clear programs on both a small and large scale.Python supports multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles. It features a dynamic type system and automatic memory management and has a large and comprehensive standard library. Python interpreters are available for installation on many operating systems, allowing Python code execution on a wide variety of systems.

4.3 JSON

JSON (JavaScript Object Notation) is a data structure format. The data are considered as objects with properties and sub-properties. This formalism is close enough is based on XML and JavaScript.

4.4 MySQL

MySQL is a relational database management system (RDBMS). It is distributed under a dual GPL and proprietary license. It is one of the database management software most used in the world.

5. Conclusion

Thus raspberry-pi being a small yet powerful device can work efficiently in digital notice board connected with softwares. Hence Webserver can provide user with real time actual data which can be used application.